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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/299,874	04/27/1999	SEIJI HASHIMOTO	862.2798	3802
5514 7590 08/25/2004 FITZPATRICK CELLA HARPER & SCINTO 30 ROCKEFELLER PLAZA NEW YORK, NY 10112			EXAMINER TRAN, NHAN T	
			ART UNIT 2615	PAPER NUMBER 22
DATE MAILED: 08/25/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/299,874

Applicant(s)

HASHIMOTO ET AL.

Examiner

Nhan T. Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 04 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-19 and 83 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5,7,8,10-18 and 83 is/are rejected.
- 7) ☒ Claim(s) 6,9 and 19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 6/4/2004 has been entered.

### ***Response to Arguments***

2. Applicant's arguments with respect to independent claim 1 have been considered but are moot in view of the new ground of rejection.

In addition, the Applicant requests the Examiner to return an initialed copy of the PTO-1449 form, indicating that the Ihara, H., et al reference was considered. However, a copy of the listed reference to Ihara, H. et al. filed 10/15/1999, paper No. 4, has not been submitted for consideration. The Applicant is requested to submit a copy of the above listed reference (*see section 3 on next page*).

***Information Disclosure Statement***

3. The information disclosure statement filed 10/15/1999 with respect to cited document reference to **Ihara, H. et al** fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country; more than one year prior to the date of application for patent in the United States.

4. Claims 1-5, 7, 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Imai (US 4,636,865).

Regarding claim 1, Imai discloses an image sensing apparatus having a plurality of unit cells arranged in two dimensions, each unit cell including a plurality of photoelectric conversion elements (e.g., 1 unit cell contains 4 pixels) and a common circuit (47-49 including control gate line  $\phi c$  33) shared by and arranged between the plurality of photoelectric conversion elements

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included in the same unit cell that the common circuit belongs to (see Figs. 5A & 5B; col. 5, lines 40-56);

wherein the common circuit processes signals from the plurality of photoelectric conversion elements and outputs the processed signals to an output line (see col. 6, line 65 – col. 7, line 24 for discharging overflowed signals to output line 34);

wherein a first distance between a center of mass of photo-receiving areas of adjoining photoelectric conversion elements included in a given unit cell is **substantially equal** to a second distance between the center of mass of photo-receiving areas of the adjoining photoelectric conversion elements included in a different unit cells, and a third distance between the center of mass of the photo-receiving area of a photoelectric conversion element included in the given unit cell and the center of mass of the photo-receiving area of the adjoining photoelectric conversion element included in an adjoining unit cell (see Figs. 5A & 5B; col. 5, lines 15-40 for **symmetrical arrangement** of four pixels which clearly indicates that a distance between a center of mass of any photo-receiving areas within the unit cell is substantially equal. It should be further noted that all pixels of the image sensor have the same size and all vertical and horizontal circuits also have substantial same size as illustrated in Fig. 5A. Therefore, the distance between the center of mass between two adjacent pixels in **different unit cells** is also **substantially equal** when Fig. 5A is expanded to show all pixels of the image sensor.

Regarding claim 2, also disclosed is that the plurality of photoelectric conversion elements in each unit cell are arranged side by side in one direction (either horizontal or vertical

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direction), and the common circuit is arranged at the edge of each plurality of photoelectric conversion elements (Fig. 5A).

Regarding claim 3, see the analysis of claim 2. Furthermore, since the common control gate line 33 is traced horizontally across the image sensor (Fig. 5A; col. 5, lines 10-15), the control gate line 33 is also shared by and arranged **between the unit cells** in a direction perpendicular to the vertical arrangement of the plurality of photoelectric conversion elements.

Regarding claims 4 & 7, see the analysis of claim 2.

Regarding claim 5, it is also seen in Fig. 5A, col. 5, lines 38-40, 55-56 that the unit cell is configured with a plurality of pixels each including a photoelectric conversion element and a number of *horizontal conductors* (three conductors for each pixel, e.g., 26, 33, 46) passing over each pixel is the same.

Regarding claim 8, similar to claim 5, Fig. 5A, col. 5, lines 62-63, col. 7, line 4 shows that the unit cell is configured with a plurality of pixels each including a photoelectric conversion element and a number of *vertical conductors* (two conductors for each pixel, e.g., 28, 34) passing over each pixel is the same.

*Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 17, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imai (US 4,636,865) in view of Guidash (US 6,160,281).

Regarding claim 17, Imai does not teach the common circuit being an amplifier for amplifying and outputting a signal from each of the plurality of photoelectric conversion elements. Instead, the common circuit is an overflow drain circuit.

However, Guidash teaches that not only an overflow drain circuit is shared, but an amplifier circuit is also shared among by multiple pixels of an image sensor that results in a saving of space in the image sensor (see Abstract).

Therefore, it would have been obvious to one of ordinary skill in the art to further enhance the pixel architecture in Imai by also sharing an amplifier among the four pixels for amplifying and outputting a signal from each of the plurality of photoelectric conversion elements so as to save space in the image sensor.

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Regarding claim 18, Guidash also teaches that the common circuit includes transfer means for transferring the signal from each of the plurality of photoelectric conversion element and reset means for resetting the common circuit (see Guidash, Abstract).

6. Claims 10-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imai (US 4,636,865) in view of Guidash (US 6,160,281) and in further view of Takahashi (US 5,955,753).

Regarding claim 10, see the combination of Imai and Guidash for the common amplifier circuit as analyzed in claim 17. Guidash teaches first signal reading means for reading a first signal (e.g., a pixel signal in row A) through the common circuit; second reading means for reading a second signal (e.g., a pixel signal in row B) through the common circuit (see Guidash, Fig. 8, col. 4, line 57 – col. 5, line 10).

Imai and Guidash do not explicitly disclose noise reading means for reading noise of the common circuit and noise reduction means for reducing the noise from the first and second signals.

Takahashi teaches noise reading means (8, 10; Fig. 1) for reading a noise (dark output) of a common circuit, store the noise signal in a capacitor (10) and a noise reduction means (differential amplifier 14) for eliminating the noise (see Fig. 1; col. 4, line 61 – col. 5, line 9).

Therefore, it would have been obvious to one of ordinary skill in the art to further improve the imaging device in the combination of Imai and Guidash by enabling a noise reading means and a noise reduction circuit to read noises of the common circuit and eliminate them from the first and second signals to produce high quality image signals.



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Regarding claim 11, Takahashi discloses the differential amplifier (14) to reduce the noise as shown in Fig. 1; col. 4, lines 61 – col. 5, line 9.

Regarding claim 12, both Guidash and Takahashi show that the first signal is read from one of the plurality of photoelectric conversion elements in each unit cell, and the second signal is read from another photoelectric conversion element in the same unit cell (see Guidash col. 4, line 57 – col. 5, line 10 and Takahashi, col. 5, lines 2-9).

Regarding claim 13, Takahashi also discloses the first signal is read from one of the plurality of photoelectric conversion elements (in case of **non-adding** mode) in each unit cell, and second signal is read from a photoelectric conversion element and another photoelectric conversion element in the same unit cell (in case of **adding** mode). See Takahashi, col. 5, lines 55-67.

Regarding claims 14-16, see the analysis in claims 10-12, respectively.

7. Claim 83 is rejected under 35 U.S.C. 103(a) as being unpatentable over Imai (US 4,636,865).

Regarding claim 83, Imai discloses an imaging apparatus having all the limitations including an inherent control unit to control overall operation of the imaging apparatus in order to function as disclosed, *except* for disclosing a lens unit that projects incoming light onto the

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unit cells. However, such an imaging apparatus would be used in a camera for capturing an object image through a lens unit as well known in the art.

Therefore, it would have been obvious to one of ordinary skill in the art to use such an image sensing apparatus in a camera in a conventional fashion for capturing an object image through a lens unit.

*Allowable Subject Matter*

8. Claims 6, 9 & 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 6 & 9, the prior art of record fails to teach or fairly suggest that *contacts between layers of each pixel are arranged so that a number of conductors passing over each unit cell, as well as one of the contacts which is not connected to a conductor passing over the unit cell is connected to a light-shield film of the pixel.*

Regarding claim 19, the prior art of record fails to teach or fairly suggest that *the common circuit is digital signal conversion means for converting a signal from each of the plurality of photoelectric conversion element into a digital signal.*

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*Conclusion*

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nhan T. Tran whose telephone number is (703) 605-4246. The examiner can normally be reached on Monday - Thursday, 8:00am - 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew B Christensen can be reached on (703) 308-9644. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

NT.



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